

Sonos, Inc.’s Motion *In Limine* No. 5

EXHIBIT B

(Filed Under Seal)

Contains Highly Confidential AEO and Source Code Materials

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

GOOGLE LLC,

Plaintiff

v.

SONOS, INC.,

Defendant.

CASE NO. 3:20-cv-06754-WHA
Related to CASE NO. 3:21-cv-07559-WHA

**OPENING EXPERT REPORT OF DR. DAN SCHONFELD REGARDING U.S. PATENT
NO. 10,848,885 AND U.S. PATENT NO. 10,469,966**

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certain demonstratives to do so. I also reserve the right to amend and/or supplement this Report should additional information or developments that may affect my opinions become available.

4. In reaching the conclusions described herein, I have considered the documents and materials identified and/or cited in this Report, as well as any materials listed in Exhibit B. My opinions are also based upon my education, training, research, knowledge, and personal and professional experience.

5. It is my understanding that Sonos may submit an expert report responding to this Report. I reserve the right to rebut any positions taken in that report.

II. SUMMARY OF OPINIONS

6. It is my opinion that claims 1-3, 5-10, 12-17, 19-20 of the '885 patent and claims 1-4, 6-12, 14-20 of the '966 patent ("the asserted claims") are invalid based on each of the following prior art references and combinations and any additional combinations set forth below in my report:

- Sonos System alone renders the asserted claims obvious;
- Sonos System in combination with Sonos Forums renders the asserted claims obvious;
- Sonos System in combination with Sonos Forums, Squeezebox, Millington, and/or Nourse renders the asserted claims obvious;
- Squeezebox alone anticipates and/or renders the asserted claims obvious;
- Squeezebox in combination with Nourse renders the asserted claims obvious;
- Squeezebox in combination with Sonos Forums, Squeezebox, Millington, and/or Nourse renders the asserted claims obvious;
- Bose in combination with Sonos Forums, Squeezebox, Millington, and/or Nourse renders the asserted claims obvious.

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Tr. pp 188-196.

179. I have excerpted certain posts within this thread below. It is notable that Sonos's product management team (likely including Mr. Lambourne) was made aware of the issues raised in the Forum thread. Farrar Dep. Tr. at 91:13-94:7; Lambourne Dep. Tr. at 143:7-144:11.

Q Did any of the product management teams review the forums to identify consumer pinpoints?

THE WITNESS: I imagine that might have happened, but I couldn't say the specific person or time.

Q Did you ever review the Sonos forums to determine whether they were particular consumer pain points with any of the Sonos products?

THE WITNESS: I read forum posts from time to time, yes.

Q Why did you read forum posts from time to time?

THE WITNESS: To see what people were saying about our product.

Q How did the feedback that you were getting through the Sonos forums affect your work?

THE WITNESS: I think -- I mean, it would depend what the comments were, but people might describe situations in which they were not happy, which we might try and solve for, or for situations which they were happy which we know that that was a good thing. Generally feedback.

Lambourne Dep. Tr. at 143:7-144:11.

180. Mr. Robert Lambourne, who was responsible for the UX aspects of the Sonos System, testified that the alleged invention addressed the same topic as the Forum posts below and believed that the concerns users were showing was also addressed in the same way by the alleged inventions. Lambourne Dep. Tr. at 128:8-131:17.

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Virtual Zones and Zone Grouping

17 years ago • 190 replies • 45404 views

27 February 2005

**theboyg** Avid Contributor I • 22 replies

This "link/unlink" business is really cumbersome - and not a joy to use which goes against the ease of use of the rest of the system.

Why can't I have a virtual zone - ie a zone called "Downstairs" - and I can group all my downstairs zones into this. Then I dont have to keep manually linking/unlinking multiple zones everytime.

PLEASE !

G.

**ievolve** Contributor III • 130 replies

Common groupings as "virtual zones"... Great Ideal

17 years ago

28 February 2005

👍 Like

” Quote

**DigitalBoy** Avid Contributor I • 1321 replies

15 years ago

5 June 2006

AudioX wrote:

Individual zones could be adjusted on the fly by highlighting the zone name (not the group) and pressing vol +/-.

You can already do this. You are not forced to have the same relative volume across all zones. The request from most users is **persistence**. It would be nice if, once you customized the relative volume, you save this as a virtual zone, or 'scene' so that it could be recalled in the future, complete with the saved *relative volume* - of course the master volume might be different, but the relativity between zones should not be lost.

db

Farrar Dep. Ex. 8-11.

182. And as with the “macro / presets” thread, Sonos employees participated in the thread, and were therefore aware of these ideas from the Forum threads at the time, and indeed noted that the product management team would consider those ideas. I have cited this testimony above. Mr. Lambourne similarly testified that these Forum posts were relevant to the alleged inventions and that the inventions would be responsive to the concerns identified by users therein.

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Again, I have cited this testimony above. I have excerpted relevant portions of this Forum thread below.



JeremyLaurenson Contributor III • 25 replies

17 years ago

Thats a great idea!



Like



Quote



JohnnyQuest Contributor III • 7 replies

17 years ago

I agree. Zone groups would be a good idea.

Regards, John



Like



Quote



howard Lyricist III • 18 replies

17 years ago

I agree as well.

Howard



Like



Quote



ievolve Contributor III • 130 replies

17 years ago

Common groupings as "virtual zones"... Great Idea!



Like



Quote



RO53BEN Enthusiast II • 4290 replies

16 years ago

I'm liking this idea, shouldn't be too difficult to implement in theory.



+2

I am no longer active on these forums, DM me if you have a question, I'd be happy to help.



Like



Quote

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garty Contributor III • 395 replies

16 years ago

I agree - I suggested this a while back.



I work from home and I have zones I use while I'm working and a different set of zones in the evening or at weekends. It certainly would make the system even easier to use if one could select a group of zones quickly.



Majik • 6113 replies

16 years ago

Agreed.

The ease of lining/unlinking zones is also dependent on the number of zones you have. 2 or 3 zones isn't too much of an imposition, but I imagine 6 or more is quite painful.

Just imagine if you had the full 32 zones!

At the moment we have a single, pre-defined group, that being "All Zones". I would like to see this as the default, but with the ability to configure your own groups and to delete the "All zones" group (some may not want this).

This would help with people who are having trouble blasting their neighbours during 2am parties by accidentally selecting hottub/garden.

Now this brings an interesting question: should zones be allowed to be in more than one group? If this is allowed, are there any unwanted side-effects with this?

Personally I would be happy with a grouping that allowed zones to be in at most one group (and this might be the easiest to implement), but others may not.

Also, if zone groups were allowed, what "display options" would be useful for the Zones display. Off the top of my head I can see uses for:

- * Hide all zones (only show groups)
- * Sorting (by name or groups before zones)

These could be either by a user preference or by a toggle button on the zone screen.

Also, how would these be displayed on the other screens (e.g. now playing)... as groups or as individual zones? I suspect individual zones would be better, as this takes into account all circumstances of use.

Cheers,

Keith

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DigitalBoy Avid Contributor I • 1321 replies

16 years ago

I like the idea. Why not have custom zone groups (like the party zone, but user customizable)? A Zone can be in 1 or more zone groups. Further you should be able to activate a group, and then add/drop individual zones for a one-off group (which is what we have now, but no ability to persist the group).

eg 'Downstairs' might be kitchen, den, master bedroom. I select the zone group 'Downstairs' and all 3 zones are sync'd. Then I add a zone 'Patio' just like we do now and 4 zones are sync'd. If I do nothing, the 4 zone group is lost when I unlink. However, maybe I decide I want this as a new group, so save it as 'Patio and downstairs'.

I'm not sure advanced group management is necessary, as you are unlikely to have 200 groups. Even with a large setup (10+ zones) it's probable you'll only have half a dozen or so groups.

Hopefully we'll see this in 1.4 😊

db



Lord Hemming Contributor I • 1 reply

15 years ago

I have a few zones now, two of my zones are so close (open plan area of the house) I always play the same music. I would like to be able to permanently link two ZPs as a single zone.

Like

Quote



AudioX Lyricist III • 5 replies

15 years ago

I totally agree - being able to group & save zones as a preset would be very useful.

Like

Quote



DigitalBoy Avid Contributor I • 1321 replies

15 years ago

For any non-Sonos users browsing these forums, you can group zones already. That's one of the big pluses for Sonos - zone grouping and perfect synchronization between zones. What we're asking for here is the ability to save a predefined group of zones as a new virtual zone to make it easy to select in future. Currently you need to link up all the zones that you want to group each time you change the zone grouping.

There is also another thread about 'scenes' where there is some overlap. That thread is more about setting volumes etc for all the zones in a group. It might make sense to combine these 2 requests as 1. The default of course would be equal volume for all the zones in a defined group. But the ability to customize the relative volume, and save that as a virtual zone would be a plus.

db

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sinuswave Lyricist III • 5 replies

15 years ago

There does seem to be some overlap in the Virtual Zone Theory and the Scene Theory. The two would indeed appear to be reasonably synergistic making a software "super feature" if you will.

I still do not want to diminish the significance of being able to have a playlist associated with presets of volume, zone players or "virtual zones" and while we are dreaming, toss in a timer function (as discussed ad nauseum) in these forums.

Like

Quote



AudioX Lyricist III • 5 replies

15 years ago

DigitalBoy wrote:

What we're asking for here is the ability to save a predefined group of zones as a new virtual zone to make it easy to select in future....

...the ability to customize the relative volume, and save that as a virtual zone would be a plus.

It would probably work best by having an option when a zone is added to the group to [adjust volume to match group](#) or [keep existing volume level](#).

When group name is selected Vol +/- operates across the board, and volumes are all relative. Zones would already have been set to the same volume if required when added to the group.

Individual zones could be adjusted on the fly by highlighting the zone name (not the group) and pressing vol +/-.

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DigitalBoy Avid Contributor I • 1321 replies

15 years ago

AudioX wrote:

Individual zones could be adjusted on the fly by highlighting the zone name (not the group) and pressing vol +/-.

You can already do this. You are not forced to have the same relative volume across all zones. The request from most users is **persistence**. It would be nice if, once you customized the relative volume, you save this as a virtual zone, or 'scene' so that it could be recalled in the future, complete with the saved *relative volume* - of course the master volume might be different, but the relativity between zones should not be lost.

db

1 person likes this

Like

Quote



MarcG Contributor I • 5 replies

15 years ago

I am just re-suggesting a feature that, alas, did not make it into Version 2.0.

My suggestion is for Virtual Zones. When I first bought my Sonos I thought it could handle multiple, permanent multi-zoneplayer zones, but it can not. I have no ability to set up a zone called 'Kitchen-Deck' which consists of mu Kitchen ZP and my Deck ZP, and to ALSO have a zone called 'Living Room-Kitchen' which consists of my living room ZP and my deck ZP. Instead I have to create a temporary zone and then later unlink it and link up a new temporary zone.

I know one of the issues with this approach would be dealing with 2 zones that shared a ZP, but I believe that would be able to be dealt with by one of 2 plans.

1. If any ZP that is part of the zone you are trying to use is already 'active', you are not allowed to interrupt
2. Last one wins. This means that if Virtual Zone 1 has my kitchen in it and is playing and I choose Virtual Zone 2 which also has my kitchen in it and I hit play, that the kitchen zone will swithc to playing the new choise.

Anyway, I realize there will be some things to work out, but as I add players to my house, this feature will be key to having a customized system.

Marc

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alphagetti666 Contributor III • 70 replies

15 years ago

With my my working shift work, I most certainly have to continually redefine my linked zones... one set when she's awake or not home, the other when she's trying to sleep... virtual zones would most certainly be a good thing.

In my case, I'd only need to be able to define four virtual zones.

👍 Like

” Quote



John Ashman Contributor III • 102 replies

15 years ago

As usual, I'm risking finding out that Sonos has this feature already (since this thing is like an onion), but it would be nice to be able to preset special "clusters" of zones, kind of like mini party modes, but with only several zones, not all. For instance, we're doing a 20-zone house that has at least three distinct areas that would never be together, the master suite area, the living area and the guest suite area. Plus two guest bedrooms, child's bedroom, office that could/should be totally segregated.

Or, it would be nice to completely isolate several areas, a Sonos system within a Sonos system, so that certain remotes don't see every zone, just the ones it is most likely to control.

Perhaps these could be handled in the Sonos controller software and then each remote can have a setting in the advanced settings which "cluster" it is in.

👍 Like

” Quote



Graham - Sonos Avid Contributor I • 824 replies

15 years ago

I personally like this idea... it has been suggested before with names such as 'zone scenes' or 'zone profiles'.

I think its a good idea, though can appreciate that it would be a good amount of UI work to get just right and not be confusing...

Its on the Radar for the PM guys, but not in the near term from what i know.

best,
-graham

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John Ashman Contributor III • 102 replies

15 years ago

I like "zone clusters", a brilliant name for a redundant idea if I've ever heard one 😊

👍 Like

” Quote



scottmi Contributor III • 12 replies

15 years ago

yes another great idea..! how has investigation and development of this feature progressed? Getting any closer?

👍 Like

” Quote



buzz • 18545 replies

15 years ago

scottmi,

SONOS never publishes their development plans.

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svk Contributor III • 40 replies

14 years ago

There are definitely zones that I don't "need" that I would likely add if I had the ability to group and persist them.

For example:

Bedroom Bathrooms
Hallways

In some cases I got around this by wiring, the hard way, what would have been more easily handled with additional zone players. In other cases I abandoned the thought all together.

Has anyone else put off purchasing additional zones due to the absence of "virtual zones"?

👍 Like ” Quote



Dr Tchok Avid Contributor I • 459 replies

14 years ago

No, but I think the Virtual Zone is a great idea...

👍 Like ” Quote



waveman69 Contributor III • 11 replies

14 years ago

I like the virutal zones suggestion. :rolleyes:

I want allso to see a feature like give premission to control some zones from a specified control or hide "these zones" on specifed controller.

Example:

My children share a zone player in the playroom with a control and can play what they want but they can allso change music/volym round the house if they want or without knowing it.

Wavey

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Beejay Contributor III • 167 replies

14 years ago

Graham - Sonos;27804 wrote:

I personally like this idea... it has been suggested before with names such as 'zone scenes' or 'zone profiles'.

I think its a good idea, though can appreciate that it would be a good amount of UI work to get just right and not be confusing...

Its on the Radar for the PM guys, but not in the near term from what i know.

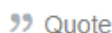
*best,
-graham*

Wow....this is about as much as Sonos give away on anything!

Personally I think its a great idea....the UI is simple - the same way you add zones now - you just have another option "create virtual zone", then you either display these amongst actual zones (taking the highest common denominator if any are ever selected) or (my preferred option) virtual zones is a soft key at the bottom of the zones screen. When selected, the zones screen behaves the same for virtual zones (Again on link zones or drop zones you take the highest common denominator). If you go back to the standard Zone screen, the actual zones are joined as per the virtual zone config. Easy....not confusing.:D



Like



Quote



Robert Avid Contributor I • 12 replies

14 years ago

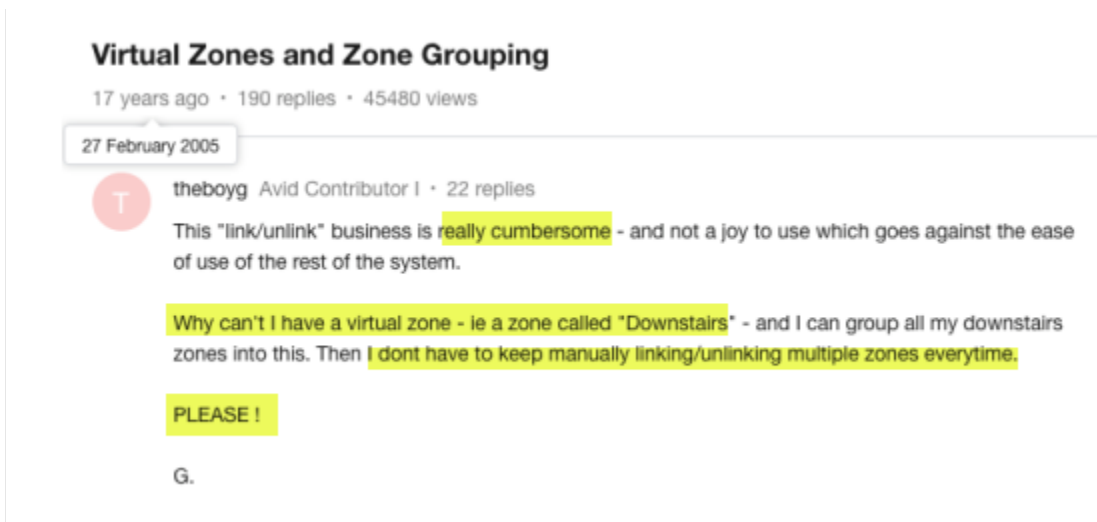
I have grown my Sonos footprint from about 4 zones to now about 20 zones. As my Sonos footprint grew I have starting wanting a couple of features that I did not need when I had a smaller set up.

First, I would like a way to save zone configurations. This would be an extension to the existing "[All Zones - Party Mode]" configuration. In an ideal world users could create additional named configurations like "Morning Radio" or "Evening Party". So for example "Morning Radio" would link all the hallway zones and the master bedroom zones and the kitchen and family room zones. Because I have outside zones that I don't want linked even with an all house party even the existing [All Zones - Party Mode] does not usually work for me.

The second feature it to make all the volumes for the selected zones be equal. Presumably this would be a new button on the volume dialog. If I link 10 or more zones it is a pain to get all the volumes to be equal. The work around is to lower, as a group, all the zones to zero then bring them all back up the desired volume but this is a hack.

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Court's Order indicated, "The specification further clarifies that zone players can be played 'synchronously if the players are grouped together,' or 'individually if the players are disassociated with each other' (*see* '885 patent at 3:26–31; *see also* 9:16–20; 10:53–63)," and the Forum post by "theboyg" discloses the same. The Court's Order clarified that a zone scene may be saved—alleviating the need for a user to "keep manually linking/unlinking multiple zones everytime"—and named like "Downstairs." Indeed, the group name "Downstairs" was also used by Dr. Almeroth to describe a "zone scene." *E.g.*, Almeroth Rep. ¶¶974, 979, 1014.



365. The Sonos Forums were moderated by Sonos, and on these Forums, Sonos users posted about Sonos products. Some of Sonos's employees (*e.g.*, Graham Farrar) participated in these Forums and reviewed users' posts and their feedback, and even Sonos's product management teams were aware of the Forum posts and feature suggestions. *See, e.g.*, Graham Farrar Dep. Tr. at 50:13-51:4, 94:14-21. Accordingly, a person of ordinary skill in the art familiar with the Sonos System would have also been familiar with the Sonos Forums.

366. To the extent it is found that the Sonos 2005 System did not explicitly disclose a "zone scene" as discussed in the Court's Order, such features would have been obvious to a person of skill in the art, in view at least of the Sonos Forums.

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playback timing information and clock timing information for another synchrony group.”); 19 (“Indeed, it will be appreciated that the zone player that is utilized as the audio information channel device for synchrony group 20(2) may also be a zone player that is utilized as the master device 21(1) or a slave device 22(1)(1),..., 22(K)(1) in the synchrony group 20(1).”).

(f) Obviousness – Lindemann

401. A person of skill in the art would have found it obvious to combine Lindemann with the Sonos System. Lindemann was cited by many Sonos patents regarding speaker grouping, including patents from the same family as the ’885 patent, indicating that persons of skill in the art recognized that Lindemann was highly relevant to the claimed features. For example, US 2013/0251174 cited to Lindemann. Lindemann and the Sonos System are both in the same field of endeavor. Lindemann Abstract (“A digital wireless loudspeaker system includes an audio transmission device for selecting and transmitting digital audio data, and wireless speakers for receiving the data and broadcasting sound. . . . Status messages are included in the transmission frames to control speaker attributes such as speaker group, enabling or disabling a sub-woofer, and volume of the loudspeaker digitally.”).

402. Lindemann discloses overlapping speaker groups. Lindemann at 0064 (“Many homes and offices have multiple groups of loudspeakers—e.g. a group of loudspeakers in the living room and another group in the kitchen. The Group Selection Switch allows a loudspeaker to be assigned to one of many groups of loudspeakers.”).

(g) Obviousness – Squeezebox

403. As Mr. Lambourne testified, he was aware of Squeezebox given its competitive nature with the Sonos System. *Supra*. Others including reviewers recognized Sonos System as a competitor of Squeezebox. *Supra*. As such, a person of skill in the art, just like the inventor of the patent, would have been motivated to look to Squeezebox and combine aspects of the two

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systems. And as discussed below, Squeezebox discloses this claim limitation.

(h) Obviousness – Sonos Forums

404. It would also have been obvious to modify the Sonos System with Sonos Forums to add this claim limitation, to the extent it is not disclosed for the same reasons discussed with respect to Limitation 1.6. For example, the Sonos Forums described *supra* (and fully incorporated herein by reference), disclose adding the first zone player to a second zone scene including the first and third zone player that can be configured for synchronous playback of media when the second zone scene is invoked. As discussed with respect to Limitation 1.6, the Sonos Forums disclose grouping the zone players of the Sonos System into overlapping groups that play back music synchronously, just as non-overlapping zone scenes do in the Sonos System.

(i) Crestron

405. As I addressed below in relation to Limitation 1.6, it would also have been obvious to modify the Sonos System with Crestron to add this claim limitation, to the extent it is not disclosed for the same reasons discussed with respect to Limitation 1.6. For example, Crestron also offered multi-room audio systems including speaker grouping and the ability for a speaker to be part of multiple speaker groups. For example, as shown below in a manual dated November 2005 and copyrighted 2005, Crestron offered multi-room audio. The system manual below did not provide other limitations on grouping—for example restricting which rooms could be grouped or not grouped.

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membership, before or after that speaker was joined to a group. Lindemann at Cl. 9 (“9. The speaker of claim 2, further comprising means, responsive to a control signal in the status data for assigning the speaker to a speaker group, for selectively activating the speaker based on the speaker group to which the speaker is assigned.”).

(f) Obviousness – Squeezebox

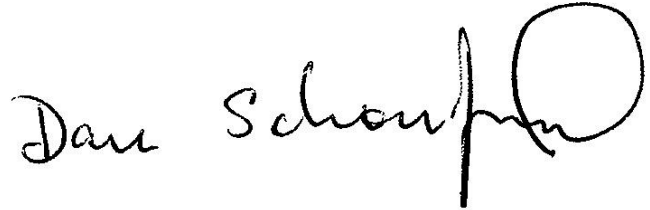
434. For the reasons discussed above e.g., with respect to Limitation 1.7, it would have been obvious to combine the Sonos System with Squeezebox. As Mr. Lambourne testified, he was aware of Squeezebox given its competitive nature with the Sonos System. *Supra*. Others including reviewers recognized Sonos System as a competitor of Squeezebox. *Supra*. As such, a person of skill in the art, just like the inventor of the patent, would have been motivated to look to Squeezebox and combine aspects of the two systems. And as discussed below, Squeezebox discloses this claim limitation. And as discussed below e.g. in Section IX.B, Squeezebox discloses this claim limitation.

(g) Obviousness – Sonos Forums

435. It would also have been obvious to modify the Sonos System with Sonos Forums to add this claim limitation, to the extent it is not disclosed for the same reasons discussed with respect to Limitation 1.6. For example, the Sonos Forums described *supra* (and fully incorporated herein by reference), disclose adding the first zone player to a first and a second zone scene as discussed with respect to Limitations 1.6 and 1.7. The Sonos Forums indicate that the players may continue to operate in their prior mode (standalone mode) until one of the zone scenes has been selected for invocation, as illustrated by the examples provided in the Sonos Forums. For example, the Sonos Forums illustrate that multiple zone scenes may be created, including overlapping zone players, and the Forums show that this system is workable such that the mere creation of a second group would not change the behavior of the speakers. In the instance where a summer and winter

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I, Dan Schonfeld, declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

A handwritten signature in black ink that reads "Dan Schonfeld". The signature is written in a cursive style, with the first name "Dan" and last name "Schonfeld" clearly legible. The signature ends with a large, circular flourish.

DATED: November 30, 2022

Dan Schonfeld, Ph.D